

UNIVERSITY OF ILLINOIS COLLEGE OF AGRICULTURE EXTENSION SERVICE IN AGRICULTURE AND HOME ECONOMICS

THE PRINCIPLES OF FITTING

APPLIED TO
PATTERN SELECTION AND ALTERATION,
GARMENT CONSTRUCTION, AND
SELECTION AND ALTERATION OF READY-TO-WEAR

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Urbana, Illinois

September, 1961

Cooperative Extension Work in Agriculture and Home Economics: University of Illinois, College of Agriculture, and the United States Department of Agriculture cooperating. LOUIS B. HOWARD, *Director*. Acts approved by Congress May 8 and June 30, 1914.

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HOME SEWING has gained stature as improved commercial patterns, new fabrics, and easier construction techniques have been developed. For many home sewers, however, fitting is often the most difficult part of clothing construction. Any garment, home-sewn or ready-made, is only as attractive as it is suitably fitted to the wearer.

This publication is designed to help the home sewer:

1. Understand the principles of fitting.
2. Select a commercial pattern that will require minimum alteration.
3. Determine the alterations needed in the paper pattern, and how to make them.
4. Check the fit of the garment through the various phases of construction.
5. Apply fitting principles to the selection and alteration of ready-to-wear.

Basic Principles

The fashion industry lives and thrives on style changes. But no matter what particular style of garment you wish to make or select, certain basic fitting principles should be applied.

THE QUALITIES OF A WELL-FITTED GARMENT

- A well-fitted garment is *well balanced* on the figure.
- The *center front* and *center back* of the garment are straight vertical lines at the center front and center back of the figure.
- *Shoulder seams* are of proper slant and length so that there are no strain lines to the bustline, wrinkles to the armholes,¹ or strains or wrinkles at the neckline.
- *Darts* point to, but not beyond, curved areas of the figure. No strain or wrinkle lines radiate from curved areas.
- The *waistline* of the garment is located at the waistline of the figure or in accordance with the design of the garment. There are no strain lines or wrinkles radiating above or below the waistline.
- *Vertical seams* hang as exact plumb lines.
- The *hem line* is parallel with the floor, except where garment design dictates otherwise.
- *Ease* allowances are adequate for comfort and appearance or design. (Ease allowances often vary with fashion or individual preferences, but an "easy" fit is usually most attractive for the majority of figures.)

When the above points are correct, the *grain lines* of the garment — both lengthwise and crosswise grains — are in correct position on the figure.

WAYS TO HANDLE FABRIC TO FIT THE FIGURE

Before attempting to fit or alter any pattern or garment, consider the ways fabric may be handled to fit body contours and create garment designs.

With care in placement of grain, fabric may be shaped to body contours with *seams*, with *darts* (including tucks, ease, gathers, and pleats), and by *radiating fullness from*

¹ Definitions of armhole and several other terms, which are sometimes not fully understood or accurately used, are given in the glossary on the inside back cover.

a curved edge. Specific designs may be created with the use of one, several, or all of these shaping methods.

Let's consider these shaping methods in more detail.

Use of Seams

Seams are used not only as construction lines, but also to create design lines. As construction lines, they enable flat fabric to be shaped to a curved figure. As design lines, they help proportion a garment to create pleasing illusion when it is on the figure.

If you plan any alteration on a seam line to correct the fit of a pattern or garment, consider how this change may affect the construction and fit of the area with which that seam connects. For example, if you shorten a seam line on one piece of the pattern, you may also have to shorten it on the edge of the adjoining piece. Also consider the effect that any change in seam lines may have on the design proportions of the garment. These points will be discussed in more detail later under specific alteration methods (see pages 13-19).

Use of Darts

The dart family includes darts, tucks, ease, pleats, and gathers. They are used to hold fullness in at one area of the garment and to release it at another area, and thereby help shape fabric to specific parts of the figure or to create a certain design effect. As already mentioned, darts should point to, but not beyond, the fullest part of a curved area. Fullness is released at the point of a dart, and this fullness can only function or fit properly when located at the exact position where it is most needed.

As an example of improper placement, a side or underarm dart which points above the bustline releases fullness above the place where it is needed. This makes the bodice appear too full at that point and perhaps too tight through the bustline. Similarly, a dart from the waistline which may be pointed properly to the crown of the bust but goes beyond the crown creates a problem. It releases fullness above the bust where it is not needed and holds in fullness at the crown where it is needed.

Obviously, a full or pronounced curved area of the figure will require more or deeper darting to fit that area than that required to fit a smaller curve. This will be described further under pattern alteration for a large bustline.

Use of Curved Edges

In addition to seams and darts, curved edges in various pattern or garment pieces provide a way to help fit flat fabric to curved areas of the figure.

When a concave curved edge is straightened on the figure, fullness radiates from that edge in proportion to the original curve depth and the degree of straightening or stretching of the curve on the figure. For example, the waistline of a circular skirt has a very pronounced curved edge (Fig. 1). When this edge is straightened to fit around the waistline of the body, fullness radiates from that edge to produce soft draping below the waistline. Most skirt waistlines are curved to some degree, but it is possible to radiate more fullness from that edge as the curve becomes deeper.

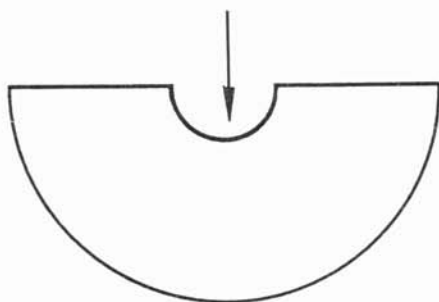


Fig. 1

Curved edges on other pattern pieces function similarly. Armscyes are an example (Fig. 2). It is possible to radiate more fullness from a deeply curved armscye

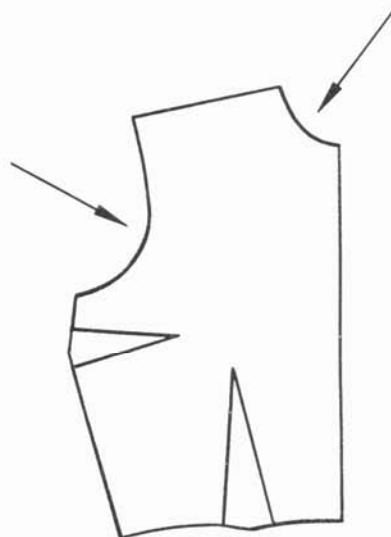


Fig. 2

than from a more shallow curve. This is also true of necklines. Greater fullness will radiate from the section of the edge where the curve is more pronounced, provided that edge is straightened or stretched when on the figure.

When you alter a curved edge, carefully consider the effect of that alteration on the function of the curved edge. For example, any alteration made on a pattern for a figure with very pronounced curves should either deepen a curved edge or leave it as originally designed; it should not make the curve more shallow (see page 17).

Selecting the Appropriate Pattern

Today's home sewer can choose from a wide variety of commercial patterns—different pattern styles and also different sizes made in a variety of figure types.

First let's look at the possible choices, and then consider how to select a commercial pattern which will help minimize fitting difficulties.

FIGURE TYPES AND SIZE RANGES

The various figure types for the maturing and adult feminine figures, as included in this discussion, may not be used by all pattern companies, but body measurement standards have been approved by the Measurement

Standards Committee of the pattern industry for most of them.

The measurements, given in inches for each size, are body (not pattern) measurements. Ease allowances are included in the patterns by the pattern makers.

Silhouette comparisons of the various figure types are shown in Fig. 3 and Fig. 4.

Sub-teen Sizes — Proportioned for the girl in early maturity whose figure is beginning to develop slightly, but is shorter than the *teen*.

Teen Sizes — Proportioned for the small, high-bosomed figure that is shorter-waisted than the *junior* sizes and not as mature.

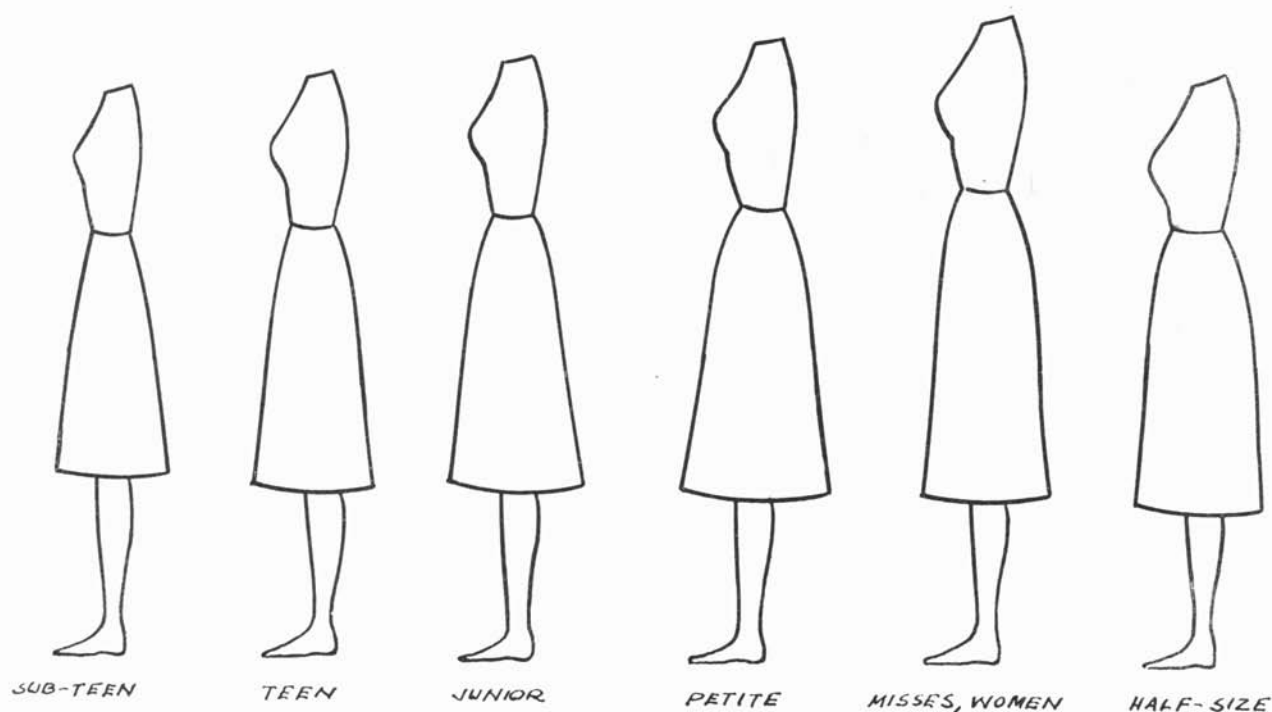


Fig. 3

Junior Sizes — Proportioned for a figure with a fully developed, high, firm bust, but which is not as tall as the *misses*. The *junior* figure has narrower shoulders and is shorter-waisted than the *misses*. *Junior* patterns are for a figure type and not for a specific age.

*Petite Sizes*¹ — For the short, fully developed figure with normal shoulder width. The *petite* figure is proportionately thicker through the waist and hips, and shorter-waisted than the *misses*.

Misses Sizes and Women's Sizes — Designed for well-proportioned, fully developed figures with normal waist length and shoulder width. The designs offered in *misses* sizes vary from youthful to mature styles. Several pattern companies carry proportioned lengths (short, medium, and tall) in *misses* sizes. *Women's* sizes are found in more mature styles, suited to the older woman and the fuller figure.

Half-Sizes — Proportioned for a fully developed figure, shorter than the *misses*, with larger waist and hips but narrower shoulders and shorter waist length.

In the front views of the four mature figure types

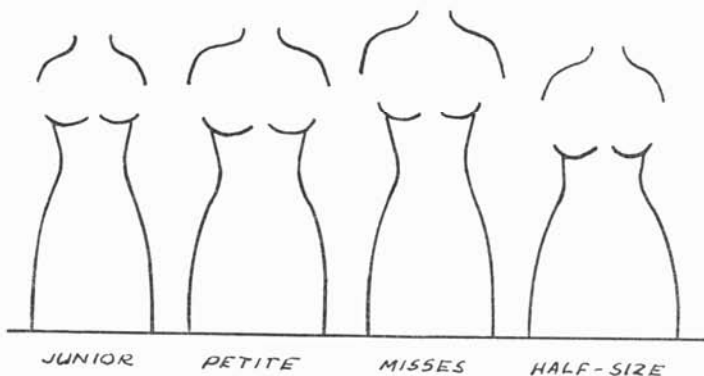


Fig. 4

¹ Body measurements have not been nationally standardized for the *petite* sizes.

Here are the body measurement standards (in inches) for the different pattern types:

Sub Teen:

SIZE	8s	10s	12s	14s
Bust.....	28	29	31	33
Waist.....	23	24	25	26
Hip.....	31	32	34	36
Back Waist Length.....	13½	13¾	14	14¼

Teen:

SIZE	8	10	12	14	16
Bust.....	29	30	32	34	36
Waist.....	23	24	25	26	28
Hip.....	31	32	34	36	38
Back Waist Length.....	14½	14¾	15	15¼	15½

Junior:

SIZE	9	11	13	15	17
Bust.....	30½	31½	33	35	37
Waist.....	23½	24½	25½	27	28½
Hip.....	32½	33½	35	37	39
Back Waist Length.....	15	15¼	15½	15¾	16

Petite:

SIZE	10p	12p	14p	16p	18p
Bust.....	31½	33	34½	36	37½
Waist.....	25	26½	28	29½	31
Hip.....	33½	35	36½	38	39½
Back Waist Length.....	15½	15¾	16	16¼	16½

Misses:

SIZE	10	12	14	16	18	20
Bust.....	31	32	34	36	38	40
Waist.....	24	25	26	28	30	32
Hip.....	33	34	36	38	40	42
Back Waist Length.....	15¾	16	16¼	16½	16¾	17

Half-Sizes:

SIZE	12½	14½	16½	18½	20½	22½	24½
Bust.....	33	35	37	39	41	43	45
Waist.....	27	29	31	33	35	37½	40
Hip.....	37	39	41	43	45	47	49
Back Waist Length.....	15¼	15½	15¾	16	16¼	16½	16¾

Women's:

SIZE	40	42	44	46	48	50
Bust.....	42	44	46	48	50	52
Waist.....	34	36	38½	41	43½	46
Hip.....	44	46	48	50	52	54
Back Waist Length.....	17½	17¾	17¾	17½	17¾	17¾

HOW TO DETERMINE YOUR PATTERN SIZE

Remember that your best pattern size may not be the same as your size in ready-to-wear. Also, some of the most difficult pattern alterations involve neckline and

sleeve areas. Some of the least difficult include lengthening or shortening pattern pieces.

Step 1 — Take Accurate Measurements

The four body measurements (bust, waist, hip, and back waist length, as listed previously for the various sizes) are the only ones which have been standardized by the pattern industry's Measurement Standards Committee. Measurements for other parts of the body are listed by some pattern companies, but they may not be identical among companies. Also, although most garment pattern companies have adopted the body measurement standards for the various sizes in the different figure types, several pattern manufacturers do not follow them. Be sure to check the measurement listings for the pattern brand you intend to buy.

To determine your pattern size, the pattern industry allows for taking measurements over outer garments which fit smoothly and are not bulky. You should wear the foundation garments you expect to wear with the garment. Measurements (see Fig. 5) should be snug — neither loose nor very tight. You will need assistance in taking the measurements. Use the following as guides:

Bust — around the fullest part and parallel with the floor.

Waist — the circumference at the natural waistline.

Hips — around the fullest part of the buttocks and parallel with the floor.

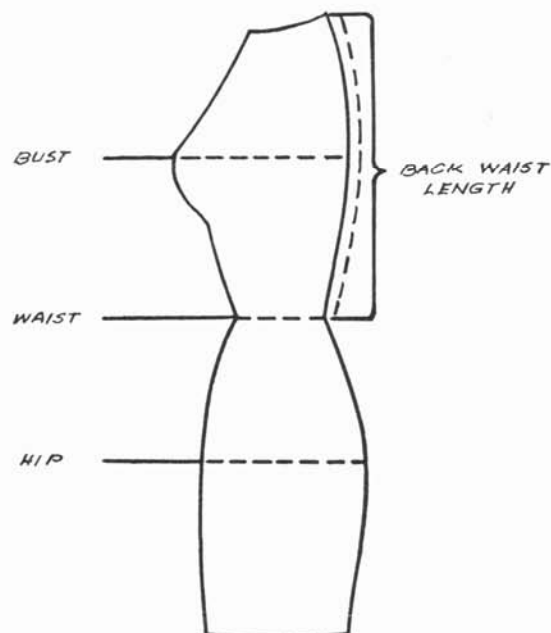


Fig. 5

Back waist length—from the top of the prominent bone at the base of the neck to the waistline. (Place a tape measure around the waist and measure to the bottom of the tape.)

It is *very important* to use an accurate tape measure. If you are not sure yours is accurate, check it against a metal tape or square, such as most men have among their carpenter tools.

Step 2 — Analyze Your Figure for Type

Compare your four measurements with those listed for the sizes in the various figure types. In addition to comparing measurements, you will want to make other comparisons because these measurements alone will not necessarily indicate your figure type. They do not take into account the length of shoulder, proportion of bone and flesh structure, and general body build. Therefore, to be more certain of your figure type, look at yourself critically and objectively in a full-length mirror. Compare what you see with the written descriptions and illustrations given for the different figure types (Fig. 3 and Fig. 4).

Step 3 — Select the Size for Your Figure

What size should you select in your particular figure type? If your four measurements are identical with those listed for any specific size (see page 6), you are very fortunate. However, if this is not true, you will have to select the size most nearly correct for you.

In selecting this size you should carefully evaluate your flesh-to-bone proportions. When there is an imbalance in proportion of flesh to bone, it is usually best to compromise in favor of bone structure. For example, if your measurements are between two sizes and you are of fleshy build, it would be better to select the smaller size to fit bone structure. If your measurements are between two sizes and you are thin or angular, it would be better to choose the larger size. This is advisable because alterations for fleshiness (or lack of it) are generally less complicated and involve fewer pattern pieces than alterations for bone structure.

Because of variations in proportion of flesh to bone, it may not be practical for some women to buy dress patterns by bust measurement, as is generally suggested. For example, if the medium- to fine-boned woman with a very heavy bust selects her dress pattern by bust measurement she will find that the pattern will need a great deal of alteration in the neckline and shoulder areas to make it small enough for her. Conversely, the medium- to large-boned woman with a small bust will probably find that a pattern selected according to her bust meas-

urement will be too small through the shoulders and perhaps also through the neckline and upper chest areas.

Generally speaking, then, the woman with a very heavy bust and a proportionately smaller frame will have less complicated alterations if she selects a pattern size smaller than her bust measurement would seem to indicate. The flat- or small-busted woman will have less fitting difficulties if she chooses a pattern size larger than her bust measurement would seem to indicate. In each case, alterations will probably have to be made through the bust area. These specific alterations will be described later (pages 16-19).

If your proportions are very different from any of the sizes listed on page 6, you may find it most satisfactory to buy two patterns, one for the bodice and another for the skirt. Adjustments will then be made at the waistline.

Very few women can use a pattern without some alteration, but with careful pattern selection the most difficult alterations can be minimized.

PATTERNS FROM DIFFERENT COMPANIES VARY

In addition to considering figure type and size, you may find that you can be better fitted if you also choose the pattern brand best suited to you. Although body measurement standards have been accepted by most makers of commercial dress patterns, home sewers often find that garments of similar design made from the same size pattern vary in fit because of differences among pattern companies.

Why should these variations occur? For one thing, only the four measurements, as described previously, have been standardized. In addition, the fit of any one pattern cannot be determined entirely by the measurements. For example, the shape of the pattern pieces with their slant and curve of seams and darts also influences the contour of the finished garment. Pattern companies differ in interpretation of body contours of the "average" figure in any given size, and in the amount of ease considered necessary for a comfortable garment.

A recent study made by the author of pattern sizes of five major pattern companies has shown the extent of differences in ease allowances and contours of patterns of different companies. Some of these differences are so pronounced as to create or eliminate alteration problems in similarly styled patterns from different companies. The study also showed, however, that each pattern company tends to be consistent in its own sizing.

Several companies make basic patterns available to customers, and list them in their pattern books. These

basic patterns resemble the master patterns which the designers and pattern drafters use as a basis for creating and sizing new patterns. A basic pattern can be very useful to the home sewer, not only as a means of determining needed alterations, but also for comparing the

fit of garments from different pattern companies. By making a basic garment of inexpensive fabric from each of the basic patterns available, the home sewer can readily see which pattern brand is best suited for her figure. This brand will require the fewest alterations.

Altering the Paper Pattern

After selecting a pattern in the figure type, size, and pattern brand best suited to your figure, determine what alterations, if any, you will have to make and the methods to use in making those alterations.

Many fitting problems cannot be solved after the fabric is cut; they must be taken care of in the paper pattern. The pattern can be altered within itself, but once the fabric is cut and the garment is under construction, all altering must be handled through darts and seams.

The principles of fitting, as discussed on page 3, will now be applied to alteration of the paper pattern. There is no *one* way to alter a pattern or to correct many fitting problems, and it is not possible in this circular to explain or illustrate every specific alteration that one may encounter. General rules, methods, and techniques are explained. Emphasis is given to the analysis of alteration and fitting problems, to help you develop a basic knowledge of why certain procedures are preferred and how to proceed.

GENERAL RULES OF ALTERATION

Three general rules of alteration should be considered. Though simple, they are basic to the analysis and mechanics of pattern alteration. These rules are:

- Add fullness where you need it.
- Remove fullness where you don't need it.
- Make pattern alterations so that the pattern lies flat.

To illustrate the application of the first rule, if more fullness is needed through the hips because of large thighs, the extra fullness should be added to the side seams, as this is where it is most needed. If the extra hip width is due to a large back hip curve or buttocks, the fullness should be added through that area of the pattern.

If a pattern is too full through the bust, apply the second rule and remove fullness in that specific area —

not at the side seams or center front — for the most satisfactory fit.

In regard to the third rule, the altered pattern must lie flat since it will be used to cut fabric which is flat.

These points will be referred to again in relation to specific alteration problems.

Before any analysis of possible alterations is attempted, *the pattern should be prepared* as follows:

1. Sort the pattern pieces according to garment sections.
2. Check the pieces with the diagram on the instruction sheet to familiarize yourself with the pattern.
3. If you will not be using all of the pattern pieces for the style you wish to make, return the extra pieces to the envelope.
4. Press the pieces to be used with a warm iron.
5. Lengthen grain line markings to the edges of the pattern pieces so that grain can be clearly observed throughout the alteration procedure and later in cutting the fabric.

HOW TO DETERMINE WHAT ALTERATIONS ARE NECESSARY

There are two basic methods for judging the fit of the paper pattern and determining necessary alterations:

- Take certain body measurements and compare them with measurements of the pattern, allowing for desired ease in addition to the actual body measurements. A variation of this *measurement method* is to measure a garment that fits correctly and compare these measurements with the paper pattern.
- Determine possible alterations by fitting the pattern directly on the figure (called the *try-on method*).

You will need assistance in taking your measurements as well as in fitting the pattern to your figure. Once the measurements are listed, the *measurement method* is likely to be easier for you to handle by yourself. How-

ever, it may also be less accurate, because measurements alone, as mentioned earlier, do not determine the fit of a garment. Fit is also influenced by placement, slant, and curve of seams and darts. Only by fitting the pattern to the figure can these be observed. Often a combination of the *measurement* and *try-on* methods will produce the easiest and most satisfactory results.

Once the alterations are determined for any given pattern brand, these alterations are usually the same or similar for other styles in that brand, and can be made without the extensive analysis described below for each pattern used.

Method 1 — Comparing Your Measurements With Those of the Pattern

Body measurements should be taken first. In determining your pattern size, you measured over your outer garments. The measurements to determine alterations should be taken over a slip, with outer garments removed.

If necessary, see page 6 for a review of how you took the four body measurements to determine your pattern size. The first three — bust, waist, and hip — must now be divided into front and back measurements for comparison with the front and back pieces of the pattern. To do this, visualize a plumb line down the side

of the figure from the shoulder through the waistline, knees, and ankles. Mark these points at bustline, waist, and hip levels with pencil marks which will wash off. Now measure the fronts and backs, using the marked points as guides. Record the distance down from the center front waistline at which point the hip measurement is taken. This distance will be used later to locate and measure the hipline of the pattern.

A suggested chart for recording the various measurements is on page 10.

Remember that all measurements should be taken snugly. Ease allowances will be added later to these body measurements before they are compared with the pattern measurements. In addition to the bust, waist, hip, and back waist length measurements, measure and record the following (illustrated in Fig. 6) :

1. *Shoulder length* — from neck base to top of arm. Determine neck base by placing a cord around the neck so that it rests in a comfortable position and mark its location at the side of the neck. Determine end of shoulder (top of arm) by raising and lowering the arm to locate the arm and shoulder joint. Mark this point.
2. *Front waist lengths* — a) from base of neck at center front to waist (allowing for bust curve), b) from middle of shoulder to bust point, and

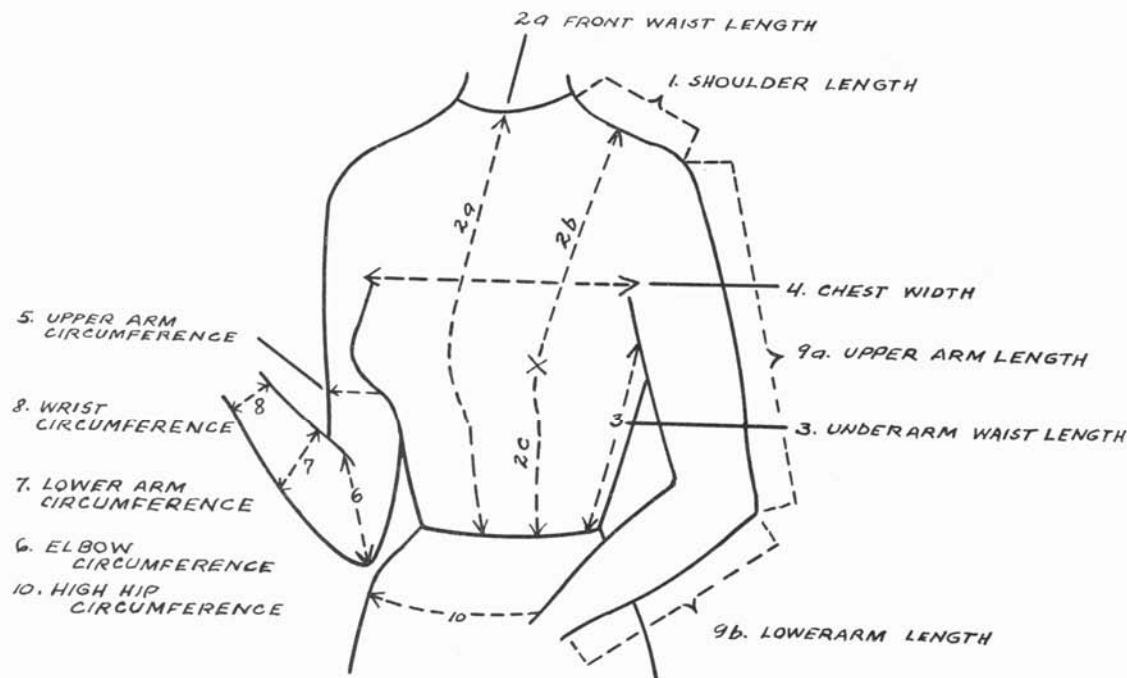


Fig. 6

c) from bust point to waist. (For all waist length measurements, put a tape measure around the waist and measure to the bottom of the tape.)

3. *Underarm waist length* — from armpit (with arm slightly raised) to waistline. Subtract 1 inch from this measurement.
4. *Chest widths* — on a level line 3 inches down from center front neck base, and on a level line 4 inches down from center back neck base. (The crease lines formed when the arms are at the sides are the points between which you should measure.)
5. *Upper arm circumference* — around the fullest part of the arm, halfway between shoulder and elbow, with the elbow bent as shown in Fig. 6.
6. *Elbow circumference* — with elbow bent.
7. *Lower arm circumference* — halfway between elbow and wrist.
8. *Wrist circumference* — at wrist bone.
9. *Arm length* — a) from shoulder to elbow, and b) from elbow to wrist, with elbow bent.
10. *High hip circumference* — on a line parallel with the floor and 3 inches down from the center front waistline.
11. *Front, back, and side skirt lengths* — from waistline to hem. Standing in shoes with the height you usually wear, tie a tape measure around your waist. Measure from center of tape to floor at center front, center back, and right and left sides. Subtract from each of these measurements the distance from the floor that you want the finished skirt to be.

Pattern measurements at the above locations should now be taken and recorded. You have recorded the distance from the waistline to where the hip measurement is to be taken on the pattern. Now measure from that point to the hem. Starting at the hem, measure up that same distance on other areas of the skirt to locate and mark the hipline. (The hipline should be parallel with the hem, although the hipline probably will not be parallel with the waistline.)

To locate the bustline on the pattern, draw lines through the center of the underarm dart and the center of the waistline dart. Locate the bust point where these lines connect. Measure the bustline on this level in the front. In the back, measure on a level line from where the front line meets the back at the side seams.

The other measurements should be self-explanatory.

Minimum ease allowances included in the pattern for a comfortably fitted garment are listed below. (There

Suggested Chart for Listing Measurements

	BODY MEASURE- MENT	EASE ALLOW- ANCE	PATTERN MEASURE- MENT	PROB- LEM	SOLU- TION
Bust					
front.....					
back.....					
Waist					
front.....					
back.....					
Hip (full hip)					
front.....					
back.....					
Back waist length					
Shoulder length					
Front waist length					
a.					
b.					
c.					

(etc. — See left column, this page.)

are exceptions where design of garment provides or requires more or less ease, as for a blouse with a yoke and bustline gathers, or a full skirt.) The allowances are keyed, by numbers in parentheses, to the listings for body measurements (Fig. 6) except for bust, waist, hip, and back waist length which are illustrated in Fig. 5. Note that not all specific body measurements require addition for ease before comparison with the measurements of the paper pattern.

Bust — 3 to 4 inches (divided about equally between front and back).

Chest — front $\frac{1}{4}$ to $\frac{1}{2}$ inch, back $\frac{1}{2}$ to 1 inch (4).

Bodice lengths — $\frac{1}{4}$ to $\frac{1}{2}$ inch (at four locations — 2a, 2b and 2c, 3, and back waist length).

Upper sleeve width — 2 to 3 inches (5).

Elbow — about 1 inch (6).

Lower sleeve width — about 1 inch for slim sleeve (7).

Wrist — about $\frac{1}{2}$ inch for slim sleeve (8).

Arm length — about $\frac{1}{2}$ inch (divided between 9a and 9b).

Waist — about $\frac{1}{2}$ inch.

High hip circumference — 1 to 2 inches (10).

Full hip circumference — 2 to 3 inches.

Add the desired ease allowances to your corresponding body measurements and compare these with the pattern measurements. Record the differences. These differences are your alteration problems. Body measurements plus ease allowances should equal pattern measurements. How to solve the alteration problems is discussed on pages 13-19.

Method 2 — Fitting the Paper Pattern Directly on the Figure

Prepare the pattern for trying on. Working on a smooth, flat surface, place small pieces of Scotch or similar tape, overlapped slightly, on the inside of the seam lines of the armscye and neckline to protect the pattern from tearing. Place the tape so that one edge is on the seam line, but do not allow it to extend into the seam allowance.

Trim the neckline and armscye on the cutting line. Leave any extra paper extending beyond the cutting lines of the other edges in case it may be needed for alterations. Clip into seam allowances of armscye and neckline. The clipping, which allows the pattern to lie smoothly at the neckline and armscye areas when the pattern is on the figure, makes it possible to judge fit accurately.

Tape and clip waistline of skirt if it is on a pronounced curve.

Pin the pattern pieces together, from the right side of pattern, along construction lines. Pin shoulder and side seams with seam allowances outward, but lap and meet other seams and darts at stitching lines.

Leave the top 2 inches of the underarm seam unpinned to prevent tearing of the pattern when it is put on. Also leave side seam and waistline darts unpinned

from about 1 inch above the waistline. Do not pin the sleeve into the armscye, as it is usually better to determine sleeve alterations as well as waistline circumference by the measurement method.

Prepare the figure before you try on the pattern. Tie or pin bands of fabric around the bust, waist, and hip of the figure. Use 2-inch strips at bustline and hipline, and a 1-inch strip at the waistline. The bands help to identify these areas for easier fitting observations and also provide a base to which the pattern can be pinned and held in place.

It is best to have assistance in trying on a pattern, but it can be done alone if you have good mirrors.

Wear the undergarment you will wear with the finished garment. If you want to wear shoulder pads, the pattern should be fitted with them.

Locate the bodice pattern on the figure. Fitting of the pattern is usually done on the right side of the figure, but if the right and left sides of the figure are uneven they may both have to be fitted separately. Locate the pattern at center front and center back, and be sure that it rests accurately at the shoulder. Pin it to the bands of fabric at center front and center back of bustline and waistline. Tape the pattern to the figure at center front and center back neckline. If the pattern is a little too snug in some areas, release pins in the darts so the pattern can be located at center front and center back.

Observe fit of the bodice. Observe the placement of the basic pattern lines in relation to the figure (see description of a well-fitted garment on page 3). As you make the observations of fit and discover any problems, pin or mark the needed alterations at the specific locations on the pattern and record them on paper. Keep necessary ease allowances in mind.

First observe the shoulder slant. The slant is too great on the pattern for the figure if there is a strain or pull line from end of shoulder to bust (Fig. 7), or if the



Fig. 7



Fig. 8



Fig. 9

pattern neckline does not settle properly or pushes up on the neckline of the figure. To make needed adjustments, release pins on the shoulder seam at the outer edge and allow the pattern to settle down properly around the neckline. Repin the corrected shoulder.

The shoulder of the pattern is too square or high for the figure if diagonal wrinkles appear from neckline to armhole (Fig. 8), or if the end of the shoulder seam does not rest on (stands away from) the figure. To remedy, remove pins at end of shoulder and repin the corrected line to remove wrinkles. If this tends to pull the pattern up too closely under the arm, this will be corrected later when the pattern is removed by moving the under seam of the armhole down to compensate (Fig. 9). The size of the armhole remains the same, but it is moved down lower on the bodice. If it is not necessary to lower the under seam of the armhole, and the total armhole is thereby smaller, the sleeve will be altered later to compensate.

The shoulder line is too long if the end of the shoulder seam hangs or droops over the end of the shoulder bone. To remedy, either mark a new seam line in the correct position (if amount of excess at top of armhole does not exceed $\frac{5}{8}$ inch and tapers to nothing at the notch), or pin out the excess in the form of a dart, starting at center of shoulder and tapering toward the bust. How to handle this alteration to make the pattern lie flat is described later (page 18). If the shoulder line is too short, record the amount to be added.

Next observe the bustline darts. Remember that they should point to, but not beyond, the fullest part of the bust. If they are not in the proper position, mark the actual position of the bust point on the pattern so you can properly locate the darts when the pattern is removed. In Fig. 10, for example, with X marking the bust point, the side dart will have to be lowered.

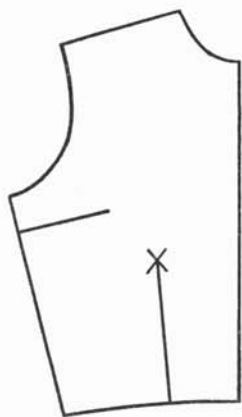


Fig. 10

The back bodice darts should point to the shoulder blades or to the most pronounced back-of-figure curves.

The side seam should be a plumb line from the armpit — at an exact right angle to the floor. If it isn't, unpin and repin it correctly.

The waistline seam of the pattern should rest on the waistline of the figure with sufficient ease allowance in bodice length. If it is not correct, record how much shortening or lengthening is necessary.

If any part of the pattern is too small or too large in circumference, this should be noted. If too large, it can be pinned out of the pattern while the pattern is on the figure. If too small, or if there is too little ease, this should be recorded, giving specific location and amount. For example, if the pattern pulls across the back of the bodice or does not allow enough ease, record the position and amount to be added for correct fit. Or, if possible, slash the pattern while it is on the figure to open the pattern for the correct amount.

When all observations have been made, carefully remove the bodice pattern. Mark any changes in seams or darts on the pattern, and any new locations of pins, before removing the pins.

Locate the skirt pattern on the figure. After fitting the bodice, prepare for a try-on of the skirt pattern. Fasten bands of fabric around the hipline and waistline. Locate and pin the center back and center front positions at waist and hip.

Observe fit of the skirt. (Refer to the first paragraph under "Observe fit of the bodice" for general directions.) First observe the hang of the side seams. Do they fall in a straight line? If not, try raising or lowering the center front or center back, being sure to keep the center front and center back of the pattern hanging straight. If a side seam swings to the front, raise it at center back or lower it at center front, or both. If a side seam swings to the back, lower it at center back or raise it at center front, or both. Record the amount of drop at the center front or center back if any was necessary. Record or pin out the amount of raise, if that was necessary.

If a side seam tends to pull or to bow to the back through the hipline area, this indicates that the skirt is too tight through the back. To correct the problem, slash the back section of the pattern through the length of the skirt, or add extra allowances at the seams of the back skirt section. Slashing and adding width through the length of the back of the skirt will make it necessary to increase back waistline darts for proper fit at the waistline. If back hip or buttocks tend to be large, increasing the darts is a good solution, as more darting is necessary for proper fit of a fuller curve. If extra hip

width is due to large thighs at the side of the figure, then it is better to add to the seam allowance at that location.

If a side seam tends to bow to the front of the skirt at the abdomen area, you'll have to add extra fullness to the front of the skirt, either by adding at the center front or by slashing through the length of the pattern piece, wherever it is most needed.

If the shape of a side seam does not conform to the shape of the figure, remove pins at the trouble area and repin.

If the darts do not point toward the fullest area, mark for correction.

Observe the skirt length. If the garment has been properly fitted up to this step, the bottom of the skirt should hang parallel with the floor.

Remove the pattern. Mark any new pin locations before removing pins from the pattern.

BASIC ALTERATION METHODS

After the alteration problems have been determined, we can consider the various ways to handle them. There are four basic alteration methods which will be described and applied to specific examples. They are, in the order of their complexity with the simplest listed first, *revising basic pattern darts*, *revising seam lines*, *slashing and spreading the pattern*, and *darting or "folding out" excess length or width*.

Often a simple change will eliminate or minimize the more complex problems that seemed to exist. For example, the proper relocation of an improperly located dart may eliminate what seemed to be excess fullness at the point of the dart.

As you make any alteration, keep the principles of fitting and the three general rules of alteration, as described on pages 3 and 8, in mind.

Revising Basic Pattern Darts

Relocating. A dart which is placed incorrectly in relation to figure contour may be relocated. For example, if the underarm dart is too high, the solution is to lower the dart so that it will point toward the crown of the bust.

There are several possible methods of moving—in this case lowering—a dart. It is usually better to lower the entire dart than to merely tip the point. For design purposes, an underarm dart line may run parallel from the underarm seam to the point or it may slant up from the seam to the point. If it slants downward to the point, it tends to give a drooped effect to the bustline.

One way you can lower an underarm dart is to slash the bodice between the bustline and the armseye throughout its width and drop the lower section the required amount (Fig. 11). This will add to the total waist length, but if the extra length is not needed it can be folded out below the underarm dart (Fig. 12). Tissue paper or a piece of old pattern should be taped to the slashed area.

Another method is to draw in the new dart location. Draw a line through the center of the dart to be moved. Then draw another line parallel to the first at the location to which the dart is to be lowered. This is the center of the new dart. If the stitching lines of the dart are straight, you can measure them at their widest part, transfer this measurement, and draw the new stitching lines around the new center dart line. If the stitching lines are curved, they can be traced from the original dart and then retraced around the new center dart line (Fig. 13). Shorten the waistline dart if it extends beyond or too high on the bustline (dotted lines).

The side seam should be a straight line when the dart is closed. To accomplish this with the new dart location,

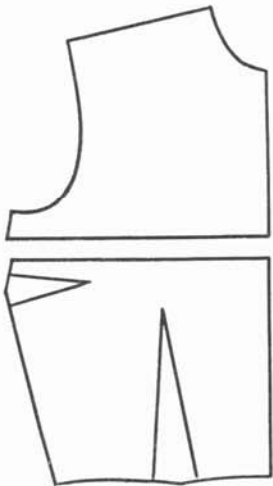


Fig. 11

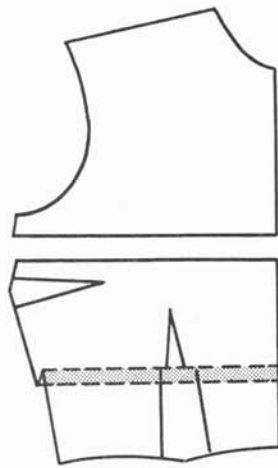


Fig. 12

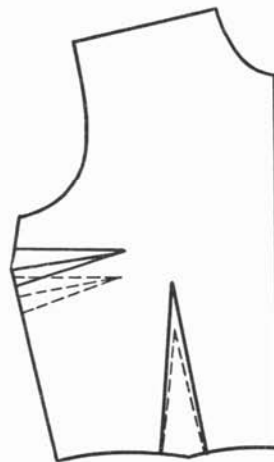


Fig. 13

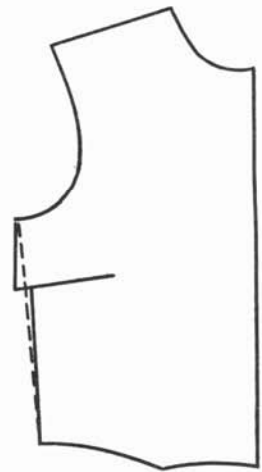


Fig. 14

pin out the new dart by folding and matching the lower stitching line to the upper stitching line. Place a ruler from the top of the cutting line of the side seam to the cutting line of the side seam at the waistline. Draw this line and cut along it before removing the pins from the dart (Fig. 14). This is the new line, to be used in cutting the fabric.

You will notice, when the pins are removed and the pattern is lying flat, that the projection at the seam edge of the dart allowance is now positioned in line with the new dart location.

Increasing or decreasing. In some instances, increasing or decreasing a construction dart will solve the fitting problem. For example, if fullness through the bustline is adequate, but the waistline is tight, the waistline dart can be decreased at the waistline and tapered to the bust. Similarly, if the fullness through the bustline is correct, but the waistline is too loose, some of this extra waistline fullness may be handled through deeper waistline darts.

If dart depth is changed, keep in mind the basic principle of fitting involving proportion of dart to size of curved body area, and also the principle applying to proper hang of side seams. For example, if deeper waistline darts in the bodice front tend to pull the side seams too far to the front at the waistline, you should take in part of the waistline fullness at the back and also alter the bustline darts to keep the side seams straight.

Subdividing. If the increase in dart depth is very great, subdividing the dart into two darts may be advisable. A very deep dart will release a great deal of fullness in one specific area (at its tip) and will give added emphasis to that area. Generally when two darts replace one they should be placed on either side of the original dart. With this placement, the fullest part of the body curve is between the points of the two darts.

Revising Seam Lines

You can make some alterations successfully on seam lines, but it is rarely possible to handle extensive alterations entirely by revising seam lines.

Consider the effect that revising a seam line will have on the lines of the garment before using this alteration method. If the seam is not revised evenly throughout its length, the slope is changed, which may cause certain areas of the garment to set unsatisfactorily on the figure. For example, if the waistline is too large and you take all of the extra fullness in at the side seams of the bodice and taper to nothing under the arm, this changes the slope of the side seam. In doing so, it tends to pull up from the waistline at that point, poke unwanted fullness

up under the arm, and cause wrinkling there when the sleeve is sewn in. It is the same effect as that of deepening a dart, because when a dart is deepened more fullness is thrown to its point. Therefore if you have to make the waistline smaller by any appreciable amount, it is usually better to divide the needed alteration among several construction areas of the waistline.

When an alteration on one pattern piece changes the length of an edge that is to be seamed to another piece, the second piece will probably need revision too. For example, when you make a change in shoulder slope by revising the shoulder seam, as described on pages 11 and 12, you will also have to make some changes in the sleeve. Sleeve alterations are described later on pages 16-18.

Slashing and Spreading the Pattern

To add length, width, or fullness, the pattern may be slashed and spread in two ways — *evenly* the full length or width of the pattern, or in a *V-shaped spread* pointing toward a seam, end of a dart, or other construction point.

Slashing and even spreading is used to add length, width, or fullness, as illustrated by the following examples.

PROBLEM: *Extra length is needed on the entire bodice.*

This situation was illustrated in Fig. 11 — the problem of needing extra length between the armhole and bust point. If length is needed between the bust point and waistline, do the slashing and spreading in that area (Fig. 15). Note that in this case the stitching lines of the dart and the side seams have to be corrected to produce straight stitching lines, as shown by broken lines in the drawing. In either case, if the extra length is

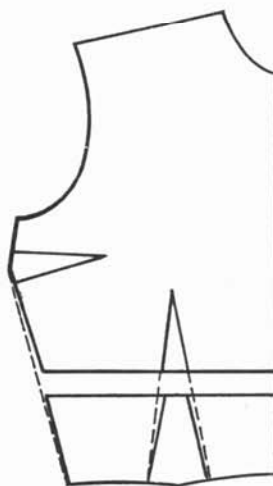


Fig. 15

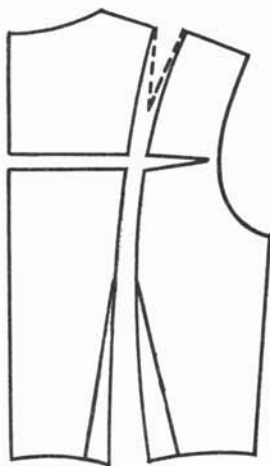


Fig. 16

needed on the whole bodice, the back pattern piece should be slashed and spread in a similar location. Tape pieces of tissue paper to the pattern pieces to fill in slashed areas.

PROBLEM: *Bodice is too narrow through the back.*
It pulls through the shoulder blade area, and if it is made into the garment that way, the seams may rip at the back armholes.

The solution is to slash the entire pattern piece lengthwise through the area of strain (shoulder blades) and through the dart, and spread the necessary amount evenly (Fig. 16). This will also add length to the shoulder and waistline seams, but this is desirable because more easing or darting, or both, is necessary on these pattern edges in this case. It helps throw fullness to, and helps shape, the curved or wide shoulder blade area. See page 14 for how to handle extra waistline darting.

Add a dart at the back shoulder seam, if one is not already there, to take up extra alteration width at that point and make the back seam fit the front seam. If the back shoulder seam already has a dart, ease the extra alteration width to the front shoulder seam during construction of the garment.

PROBLEM: *More fullness is needed in the back of the skirt through the buttocks.*

Be sure that the dart (or darts) is pointing toward the fullest area of the back figure curve. If it isn't, relocate it to the proper position. Slash the pattern lengthwise through the dart, or between the darts if there are two, and all the way down through the hem. Spread the required amount evenly. This even spread will preserve the original hang of the skirt. If it is spread more at the bottom than at the top, the skirt will hang fuller at the

bottom. Tape a piece of tissue paper to the pattern pieces to fill in the spread area (Fig. 17).

If the waistline fit was correct before the alterations, the fullness should be taken into a deeper dart at the waistline. If this makes a very deep dart, divide the amount of darting necessary into two darts.

If the waistline also needs to be larger, draw the required darting at the area where the pattern was spread. (Check waistline size by the measurement method.)

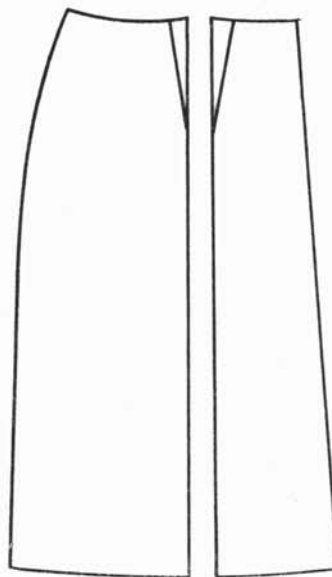


Fig. 17

Slashing and uneven spreading may be used to add extra length and width, and to alter the fit for uncommon proportions.

When you slash a pattern and spread the slash unevenly, additional changes or corrections may be needed in that pattern piece to make it lie flat or to straighten seam and dart lines.

PROBLEM: *Extra length is needed at the side seam, but not at the center back of the bodice.*
The pattern will have to be slashed and spread unevenly. (This might be necessary when an alteration is made for more length through the bodice front.)

Slash the pattern from the side seam to center back. Do not spread the pattern at the center back; spread the required amount at the side seam (Fig. 18). Fill in the slashed area with tissue paper. You will note that seam and dart stitching lines will have to be corrected, as shown with broken lines in the drawing. To do this, place a ruler on the seam or dart line on the upper part

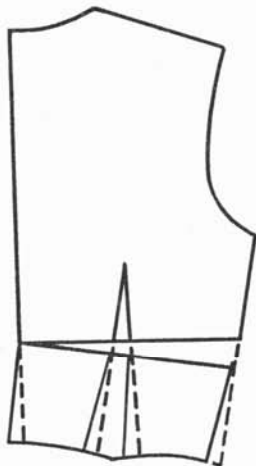


Fig. 18

of the pattern piece and extend this line across the alteration area and to the waistline. (This same method may be used to add extra length at the side seam of the skirt when no extra length is needed at the center of the skirt.)

PROBLEM: *Back of figure is exceptionally rounded.* Not only is extra width needed through the back bodice, as described on page 15, but also extra length is needed through the center back.

Slash the pattern lengthwise through the shoulder blade area. Spread the necessary amount for extra width through the shoulder blades.

To add length, slash across the center back section of the pattern and spread the required amount evenly. Be sure to keep the center back even throughout its entire length (Fig. 19). Slash the side section of the pattern from the shoulder blade area just to the armhole



Fig. 19

seam line and spread in a V shape. Make the open end of the V the same width as the spread for length on the center back section of the pattern. Fill in the slashed areas with tissue paper.

Extra length which has been added to shoulder and waistline seams should be handled as described on page 15. The length of the armhole has not been changed, but the curve has become more pronounced. This deeper curve is desirable because of the fuller curve on the back of the figure. No change will be necessary on the sleeve because of this alteration.

PROBLEM: *Sleeve is too tight and pulls through upper arm.*

Slash the pattern through the middle of the sleeve on the lengthwise grain from the bottom just to the seam line at the top of the cap. Spread the pattern in a V shape with the wide end at the bottom, but do not spread through the cap seam line (Fig. 20.) Open the amount that is necessary for extra fullness through the girth of the sleeve at the bottom of the cap where it connects with the main body of the sleeve.

You will note that this fans out the bottom of the sleeve. To bring the wrist area back to original size, take darts through the girth area with the points of the darts ending at the seam line. The darts should be just deep enough to bring the bottom of the sleeve back to the desired position (Fig. 21). Tape tissue paper to the pattern to fill in the slashed area. Re-mark the grain line through the center of alteration.

In analyzing the alteration you will note that fullness has been added where it is needed. The pattern lies flat. There has been no change in the length of the seam line of the sleeve cap, but because of the alteration darts the sleeve cap has been shortened. This is usually acceptable with the problem of a large upper arm, but if the cap has been shortened too much, cap height can be added as illustrated with broken lines in Fig. 22.

This same alteration by slashing and spreading would also apply to a short or $\frac{3}{4}$ -length sleeve. With a short sleeve the pattern probably will not be brought back entirely to its original position at the bottom.

PROBLEM: *Bodice is too tight through the bustline.*

Slash the pattern through the center of the waistline dart to the bust point and up to the armhole seam at the notch area. Spread at the waistline, but not through the armhole seam, the amount necessary for additional fullness through the crown of the bust (Fig. 23). Trim the side section at the waistline dart area to make that side of the dart stitching line the same length as the other side of the dart, as shown with broken lines. If a dart is too large, divide it into two darts.

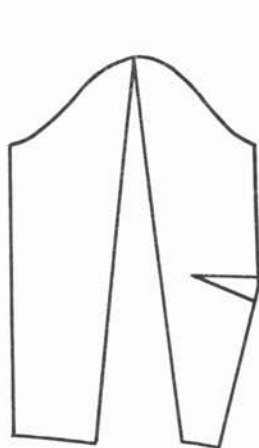


Fig. 20

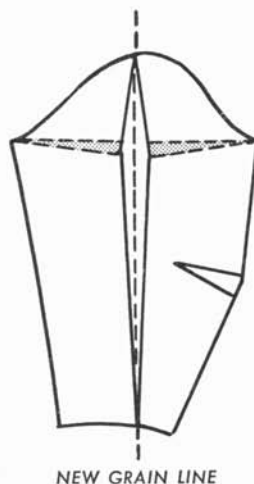


Fig. 21

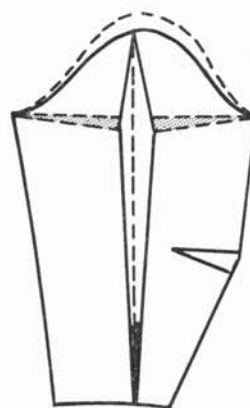


Fig. 22

This alteration will add only width through the bustline area. If extra center front length is also needed, slash through the center front section of the pattern at the bustline and spread the required amount evenly (Fig. 24).

The length of the armseye has not been changed, but the curve has been deepened. This is desirable, as explained previously, when a fuller body curve is involved. The waistline has been enlarged, which makes it possible to have more darting to the fuller bustline.

Darting or "Folding Out" Excess Length or Width

You can pin excess length or width out of the pattern by opening and lapping sections of the pattern or by folding or darting. In most cases the darts will be alteration darts rather than construction darts. That is, they will be folded out of the pattern and will not appear

in the finished garment. If the alteration dart does not extend from one pattern edge to another, it will be necessary to slash the pattern from the closest edge to the point of the alteration dart to make the pattern lie flat. This slashing is often done through construction darts.

PROBLEM: *Sleeve cap is too high.* It may need shortening because of an alteration in the bodice armseye, or it may be proportioned wrong for the figure and not have any connection with the alteration of another pattern piece. If the latter is true, horizontal wrinkle lines will appear through the cap, or the sleeve will stand up at the shoulder point.

To solve the problem, fold out the excess height evenly through the cap area. Remember that when a

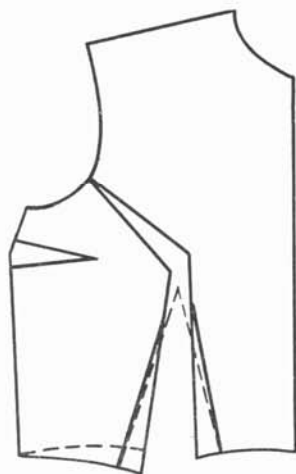


Fig. 23

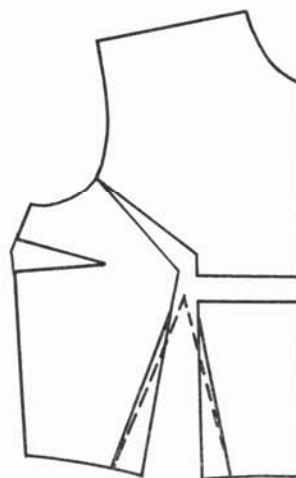


Fig. 24

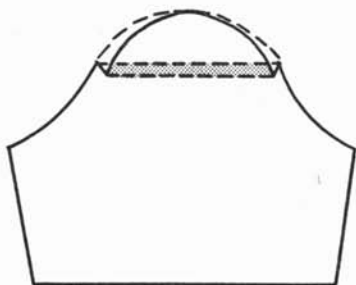


Fig. 25

fold is made the pattern is doubled, so its width should be half that of the required amount (Fig. 25). (If the cap needs to be lengthened, it should be slashed and spread in the same area.) The seam line will have to be corrected, as shown with the broken lines.

This same method for shortening or taking out width an even amount will also apply to other pattern pieces. It has already been illustrated for shortening the bodice in Fig. 12.

PROBLEM: *Front armscye is too large.* The problem appears as a wrinkle of excess fabric coming out of the armscye toward the bustline.

Dart out the excess fullness, as indicated by the wrinkle in the pattern, and pin. The dart will tend to point toward the bust and will probably be rather shallow. You will note that the pattern will not lie flat with this alteration dart. The remedy is to slash up through the waistline dart and to the point of the alteration dart, allowing the pattern to open in that area until it lies flat (Fig. 26).

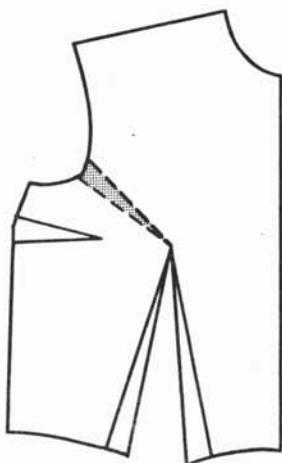


Fig. 26

The amount added at the waistline as a result of this alteration should be handled through a larger dart or divided into two darts. The extra darting is desirable because there was not enough shaping for the bustline area. This, as well as the large front armscye, caused the wrinkle to appear. The shaping is also helped with the deepening of the armscye curve.

With this alteration on the bodice, and the resulting change in length of the front armscye, it will also be necessary to alter the sleeve. Take the extra length out of the sleeve cap in an even fold, as described on page 17, even though fullness may be taken out of only one side of the bodice armscye. This is done to preserve the balance and shape of the sleeve cap. The point or dot at the top of the cap which is to match with the shoulder seam will have to be changed to make the sleeve hang correctly. In this case the dot should be moved forward by half the amount taken out of the front bodice armscye to compensate for the shorter length in that area.

This problem of improper sleeve location could also occur at the back armscye if a figure is very curved through the back or if the arms set forward on the figure. Make the alteration dart where the wrinkle appears. Slash the pattern to make it lie flat, from the shoulder or the waistline dart, depending on whether the alteration dart points toward one or the other of these construction darts. If there is no shoulder dart and the alteration dart comes at the top of the armscye, slash through the middle of the shoulder to the point of the alteration dart, and create a shoulder construction dart to compensate for the resulting extra shoulder length. (This same technique should also be used if an alteration dart is made to narrow the shoulders, as described on page 12. Split the waistline dart to the point of the alteration dart to make the pattern lie flat.)

PROBLEM: *The front bodice is too big through the bust.* It is too long through the center front as well as too wide through the bust area.

When the bust is small in proportion to the rest of the figure, you will have to take fullness out of the bust area. Slash the pattern through the waistline dart and the bust point to the notch area of the armscye, but not through the armscye seam. At this opening lap the necessary amount to decrease the width at the bustline. The lap will be in a V shape because nothing is taken out at the armscye (Fig. 27). Tape to hold in place.

This alteration not only eliminates extra fullness at the bust, but also decreases the waistline dart. This is desirable because less darting is needed for a small

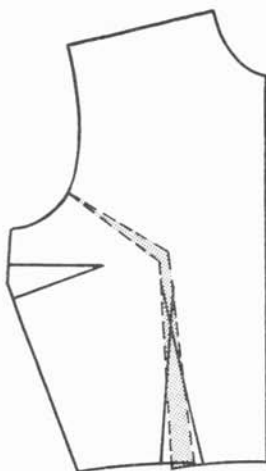


Fig. 27

curved area. The length of the armhole has not been changed, but the curve is not as deep. This is also desirable in relation to the small bustline.

If the bodice is too long through the center front and over the bust, as well as being too wide through the bust, fold out the extra length through the underarm dart and through the center front. (If the underarm dart is

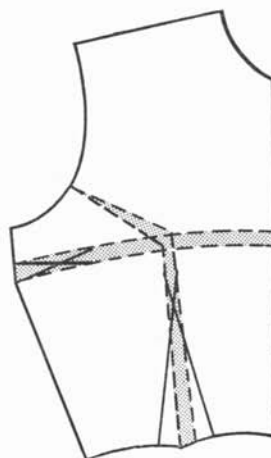


Fig. 28

on a slant, it will be more convenient to slash through this area and lap the necessary amount.) Tape in place. This alteration does not change the length of the side seam, but it creates a smaller underarm dart (Fig. 28). The waistline and underarm darts will remain the same length as the original dart, but will be smaller in depth.

Checking the Fit of the Garment During Construction

The paper pattern does not handle and drape on the body in exactly the same way as fabric does, and measurements cannot tell the whole story of fitting. Therefore there may be some minor fitting problems which you will have to handle during construction of the garment.

It is usually advisable to try on and check the fit of the bodice of the garment before the sleeves are sewn into the armholes and before the collar is attached. Then attach sleeves and collar and recheck the fit. Try on and

check the fit of the skirt before it is attached to the bodice. Attach bodice to skirt and analyze the total fit.

Use the same general method for analyzing the fit of the garment as you did when trying the paper pattern on the figure (pages 11-13). Check the balance lines. Be sure that the center front and center back are straight and properly located. Then check the set and hang of shoulder, placement of darts, and straightness of seams.

During construction, any necessary changes in fit will have to be made in the seam lines or darts.

Fitting Principles Applied to Selection and Alteration of Ready-to-Wear

Although the same fitting principles apply to both pattern and ready-to-wear alteration, different techniques are involved. Ready-to-wear alterations have to be done entirely through seams and darts. See page 3 for fitting principles and page 19 for how to check fit.

Carefully observe the garment you are considering buying. Check from all sides—sitting, standing, and walking—before a full-length triple mirror. Before buying it, consider the way each part fits and what the possibilities for producing a correct fit are. Is there enough fabric to work with? If stitching lines have to be moved, will they show or can they be steamed out? Will an alteration interfere with the design lines of the garment? Will the needed alterations be so complicated as to make the purchase of the garment impractical?

Here are a few examples of possible fitting problems.

THE BODICE . . .

—*Is the shoulder slant correct?* If not, can the alteration be made in the shoulder seam to correct the problem? What changes would be needed in the sleeve? Can these changes be made?

—*Is the garment too long in the shoulders?* If so, it is wise to make as much adjustment as possible in the bodice without trimming the armscye. The top of the bodice armscye can be trimmed as much as $\frac{3}{8}$ inch and tapered to nothing at the notch, but to make this alteration you will have to remove the sleeve. Excess shoulder length might be eliminated by pushing it into a shoulder dart, or by taking it into any seam which runs lengthwise between the shoulder seam and the waistline.

—*Does the front pull tight over the bust* or are there diagonal strain lines from the bust to the waistline at the sides? If so, first check placement of the darts. If incorrect, can they be corrected and will adjusting them solve the problem? Will letting out the underarm seam and throwing more fullness to the waistline dart from the front seam allowance help solve the problem?

—*Do the side seams hang straight?* If not, is there enough seam allowance to correct them?

—*Is the back wide enough?* If not, are there seams that can be let out at the area of strain?

—*Is the waist length correct?* If not, can it be corrected at the waistline seam?

—*Is the waistline the correct size?* If it is too tight, is there enough allowance in darts and seams to solve the problem and still keep the balance correct? If it is

too loose, can the necessary alteration be divided among construction lines going to the waistline to preserve balance of the garment on the figure?

—*Are there any unwanted wrinkles, bulges, or strain lines?* If so, these may be indications of any of the above problems, or they may indicate improper shaping of the garment for your figure. Can seams or darts be adjusted to solve the problems?

THE SLEEVES . . .

—*Are they set properly?* Is the grain in the correct position?

—*Is there a wrinkle from the shoulder seam toward the underarm at the armscye?* If the cap is too low, you must add extra length at the top of the sleeve cap. Is there enough seam allowance to do this?

—*Are there any pull lines across the top of the cap?* These lines (strain lines, not wrinkles) indicate that the cap is too narrow. Is there enough seam allowance in the cap to make the correction?

—*Are elbow darts in the correct position?* Can they be relocated?

—*Is sleeve length correct?* If the sleeves are too short, is there enough hem to let out?

THE SKIRT . . .

—*Does it "poke out" in front or back?* If so, is there enough fabric at the waistline to let the skirt down at that point, or can the problem be corrected by lifting at the opposite side? Is there enough hem allowance to allow such lifting?

—*Do the side seams hang straight?* If not, the condition may be caused by the above problem, or it may be in the stitching of the seams themselves. Are they deep enough to alter?

—*Are the darts placed correctly?* Are they deep enough, or too deep? If they are too deep, can they be let out and can the extra waistline fullness thus produced be taken in at the side seams?

—*Is there enough ease over the hips?* If not, are the seams deep enough to alter? If they are not, is the skirt long enough, or can the hem be let out so the skirt can be raised to get more fullness through the hips? (If the skirt is raised, the extra length is cut off at the waistline.)

—*Is the hem line straight?*

—*Is the skirt long enough?* If not, is there sufficient hem allowance to let out?

Glossary

- Alteration dart** V-shaped fold made in the paper pattern (it does not appear in the finished garment) to improve fit. When an alteration dart does not extend from one pattern edge to another edge, the pattern usually has to be slashed from the opposite edge or from a construction dart to the point of the alteration dart to allow the pattern to lie flat.
- Armhole** Armhole. The hole or opening through which the arm passes or at which the sleeve is attached.
- Concave curve** An inward curve, as the inside of a circle.
- Construction dart** . . . A dart which is used in the pattern (and appears in the finished garment) to help fit a curved area.
- Ease** Extra fullness which must be held into one seam edge when it is sewn into another edge which is shorter, as when sewing a longer back shoulder seam into a shorter front shoulder seam. Also: The excess fabric width or length allowed on certain areas of a garment to provide comfort and easy movement. An example is extra fullness allowed through the bustline in addition to the actual body measurement of that area.
- Figure** A classification of a type of body structure determined by proportion of bone and flesh as well as by contours and measurements of certain areas of the body.
- Grain of fabric** All woven fabrics have two grain lines — lengthwise and crosswise — which are produced by the interweaving of yarns. The position of the grain lines on the figure influences both the fit and design of a garment.
- Plumb line** A straight vertical line.

Here are some of the more important points to remember when altering the paper pattern or ready-to-wear garment:

1. Watch for garment balance — at center front, center back, shoulder line, waistline, and side seams.

2. Darts (ease, tuck, etc.) should point to, but not beyond, the fullest part of a curved area. The fuller the curve, the deeper the dart.

3. If any alteration is made in a seam line, be sure to consider how it affects the area with which that seam connects.

4. When a curved edge is straightened to any degree when on the figure, fullness radiates from that edge in proportion to the original depth of the curve and the degree of straightening or stretching of the curve on the figure.

5. The basic fundamentals of alteration:

- Add fullness where you need it.
- Remove fullness where you don't need it.
- Make pattern alterations so that the pattern lies flat.